Research Report 1344

On Closing the Implementation Gap: Symposium Proceedings

Cynthia Roberts-Gray, Editor

Perceptronics, Inc.

ARI Field Unit at Presidio of Monterey, California

Training Research Laboratory

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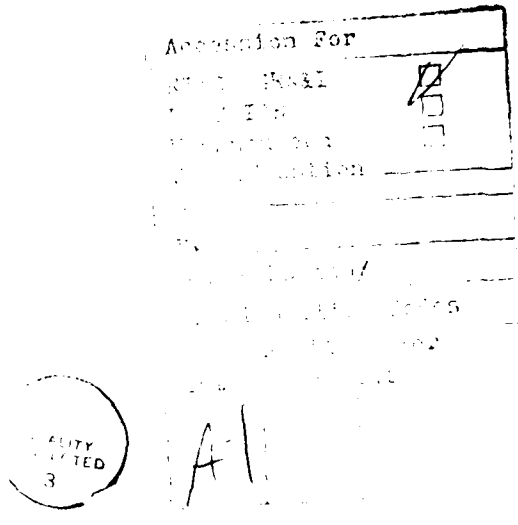

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This set of papers discusses ways to increase the return on investments in innovation and training development by taking steps to close the "implementation gap" that opens when new products are received but not used in the field. The papers were developed for a symposium conducted during the meeting of the American Psychological Association in August 1981. They examine the nature of the implementation problems and recommend procedures for anticipating the problems and improving implementation planning and tracking as means for closing the implementation gap.

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FOREWORD

The Presidio of Monterey Field Unit is conducting a program of research intended to improve Army unit training. One important approach to better training is through better implementation of training products exported to units. Issues in the transfer of training technology are therefore being investigated. This set of papers was developed for a symposium conducted at the meeting of the American Psychological Association in August 1981. The purpose of the symposium was to examine the issues and recommend procedures for closing the "implementation gap" that opens when needed innovations are introduced but remain unused or even untried in the field. The papers include two case studies of implementation of Army training innovations, extrapolations from implementation studies in education and industry, and two models to improve planning and tracking of implementation. The symposium was supported by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) as part of a research effort aimed at developing a model of technology transfer and implementation for Army training products. A companion volume to this report is ARI Research Report 1350, A Guide to Implementation of Training Products, which elaborates many of the issues raised during the symposium.

The results of this research have implications for Training and Doctrine Command (TRADOC) developers of training products and for the headquarters of major commands that establish policy for utilization of the products.

EDGAR M. JOHNSON
Technical Director

ON CLOSING THE IMPLEMENTATION GAP: SYMPOSIUM PROCEEDINGS

EXECUTIVE SUMMARY

Requirement:

This symposium was one element of a program of research conducted to contribute to better training through improved implementation of the training poroducts exported to units. The purpose of the symposium was to examine the nature of implementation problems and recommend procedures for improved implementation planning and tracking.

Background:

Implementation is a key issue in determining the benefits of a training product. No innovation--no matter how promising--can produce its intended results unless it is effectively implemented. It would seem, therefore, that a design for implementation would be a major part of any program for training development or modernization. However, in the Army, as in other sectors of society, there are many examples of heavy investment in the development of an innovation without an accompanying implementation plan. The consequence is an "implementation gap" where promising innovations sit unused and even unopened on storage shelves or in office files while much needed improvements in training exist as formally endorsed paper policy instead of actual practice.

Product:

The papers in this report examine the issues and recommend procedures for closing the implementation gap and thereby increasing the benefits of training development and modernization. The papers, which were prepared for a symposium conducted during the annual meeting of the American Psychological Association in August 1981, describe the "doleful dynamics" of implementation, present case studies of implementation for REALTRAIN and for the Army's new Rifle Marksmanship Program, and describe approaches to better implementation planning and tracking.

Utilization of Findings:

The information in this report was used in developing A Guide to Implementation of Training Products, which describes and recommends procedures for planning, executing, and tracking implementation programs for Army training products exported to units in the field. The information was also used in developing feedback to facilitate implementation of the Multiple Integrated Laser Engagement System (MILES), a tactical engagement simulation system currently undergoing fielding and initial implementation for training in units. In addition to these immediate applications, it is expected that the papers included in this

report will be of use to product and program managers in Development and Readiness Command (DARCOM) as well as in Training and Doctrine Command (TRADOC), to TRADOC's Branch Training Teams (BTT), which are responsible for detecting and assisting with implementation problems for training products, and to the Army's Organizational Effectiveness (OE) Officers and NCOs, whose goals include helping the Army cope with change.

ON CLOSING THE IMPLEMENTATION GAP: SYMPOSIUM PROCEEDINGS

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ON CLOSING THE IMPLEMENTATION GAP: SYMPOSIUM PROCEEDINGS

INTRODUCTION

In the Army, as in other sectors of society, the development and adoption of a "good" solution is not always sufficient to ensure that the solution will actually be applied to its problem. Practice often falls short of stated policy or goals for change and creates an "implementation gap" where needed innovations end up in the closet or file cabinet. When such a situation occurs, the organization loses not only the money wasted on the development or acquisition of new knowledge or technology, but also the opportunity to achieve benefits intended by the change. The cost to the organization's individual members is in the lost opportunity to improve their output and in the frustrations associated with foiled attempts to implement desired changes.

The papers included in this report discuss ways to reduce these losses and increase the return on investments in innovation by exploring methods and strategies for closing "the implementation gap" and making the actual outcomes of innovation closer to stated intentions.

In the first paper, Havelock discusses the "doleful dynamics" of implementation. He points out that the requirements of the implementation and continuation stages of innovation are always underestimated, get less attention and resources, and are more complicated than innovators realize. He recommends that steps be taken to make implementation "first" rather than "last" in planning for innovation.

The next two papers provide case studies of two Army training innovations. Scott's paper describes factors that inhibited successful implementation of a tactical engagement simulation system, REALTRAIN, introduced in the late 1970s for training in units. Loftin's paper discusses factors expected to facilitate successful implementation of a rifle marksmanship program currently being introduced for training in institutions. Both papers indicate the need for user input or participation in the training development process and for developer participation in the implementation process.

The last two papers describe approaches to better implementation planning. Wacker and Nadler describe "myths" or faulty assumptions about innovation and implementation of which planners should be aware. They also introduce a number of planning and design principles to guide implementation planning so that implementation gaps are avoided. Gray's paper outlines a model of implementation that can be used to assist product managers in setting implementation objectives, developing and executing implementation plans, and obtaining feedback to control the implementation process.

Collectively, the papers examine the issues and recommend procedures for closing the implementation gap and increasing the benefits of innovation and planned change.

HELPING AT THE BACK END OF THE CHANGE PROCESS

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The phases of any innovation effort can be divided roughly into two segments, the front end and the back end. The front end includes such processes as developing an awareness of the innovation, arousing the motivation for change, acquiring specific knowledge about the innovation and its effects, and making a decision to adopt the innovation in some form at some level. These front end processes have generally received the most attention in the past both from researchers on the change process and from change agents themselves. More recently attention and concern have shifted to back end processes, which include initial implementation and startup, continuation and maintenance, integration and adaptation, routinization, reevaluation, and self-renewal. This paper elucidates some major issues related to such back end processes, and focuses first on description and differentiation of such processes, second on the range of problems that typically arise in dealing with back end segments, and third on the types of change agent activity relevant at the back end of the change process.

The Innovation vs. the Establishment

Organizations must continually innovate in order to stay competitive and viable. Nevertheless, "host" systems tend to rely on the status quo to ensure their overriding goal of survival. This reliance usually means hanging on to existing forms and procedures that have worked in the past and rejecting anything that would interfere with or replace them. This strategy is successful most of the time; the motivation to innovate is always the exception rather than the rule.

Because change is necessary, however, most systems, realizing the necessity of a degree of adaptability for survival, tolerate continuous innovation activity on their fringes. Innovators often confuse this tolerance with acceptance, which it frequently is not. An innovative project or program is a temporary system existing as a kind of parasite on its host system. Host organizations have an immunity mechanism that takes over as the innovation life cycle is played out and full integration is sought by the innovators. Only what passes through this immune reaction and proves compatible with the whole system can become routine and thus survive.

The Life Cycle of the Innovation System

The front end of the change process tends to get most of the attention, resources, change agent effort, glitter, and such. A new concept may be given a long time to germinate. It may require an idea stage, a planning stage, planning negotiation, acceptance by leadership, resource acquisition, and a "project go-ahead" decision. Several development stages can follow, including formal structure of the project, final planning, resource allocation, staffing the project, fabricating a prototype, and so on. By the time these stages

have been accomplished, early enthusiasm may have cooled or the project may be turned over to another agency with a much lower level of commitment to the innovation.

The back end of change, beginning when the innovation is fielded, is always underestimated, and tends to be longer and more complicated than innovators realize. The back end gets less attention and fewer resources than the front end, and the trend gets worse as time passes.

There is a lot of confusion about the term "implementation." Sometimes it merely refers to trying out an innovation, that is, getting people to perform the right actions a time or two. Other times the term refers to the whole back end of the change process. Most often implementation means full field testing and full operationalization of the development plan. However, success in these stages still does not mean that the innovation will ultimately succeed. Additional "continuation" stages--probably the least understood and most difficult aspects of the change process--are necessary to move an innovation to full acceptance and routine use within the host system.

The Doleful Dynamics of the Back End

Implementation is often accompanied by a decline in the romantic factor. Activity is initially spurred on by the Hawthorne effect, but the "new" wears off and the energy investment by staff and other participants is critically reduced. The resources committed to the innovation are usually depleted, regardless of plans to reserve them for the back end. Everything costs more than expected, and, in a fixed-cost environment, back end support is robbed by the stages that come earlier. It is very difficult to maintain a satellite project permanently, but it may be even more difficult to get hard money support from the budgets of permanent host systems. As project money disappears, there is increased competition from routine system concerns, competition from new projects and innovations, and the hard reality of ongoing performance costs that are usually greater than anticipated. The project gets reduced attention from upper management and its visibility is lowered (although this may be a benefit in avoiding the host system's immune mechanism). Too often the results and benefits are more modest than early adopters expected and less than promoters and advocates promised. As the project becomes more vulnerable, former resistance may resurface, particularly with leadership turnover that typically replaces energetic, talented, creative innovation leaders with others who have fewer of these attributes. Second-generation leadership may have less authority or clout with the management of the host system. Finally, it is a hard fact of life that being last makes for losers; this rule also applies to later stages in the development process, so that full-scale field and validation tests may be dropped from the development plan.

Host System Orientation Toward Continuation

Even after some initial successes, an innovation is not ensured continuation but may be rejected on rational grounds, such as failure to measure up in the current method of calculating the cost/benefit value. Or the innovation may be rejected on nonrational grounds, perhaps because new managers have their own pet projects. Frequently innovations cannot be accepted in toto; parts are

cannibalized to support other systems, or only certain aspects of the innovation fit into the organizational framework. Innovations are often designed so that this fragmentation seriously degrades or destroys their original intent. An innovation may also begin to displace forms or standard practices and thus cause renewed resistance among the "old guard." It is often impossible to have parallel acceptance of new and old.

One alternative is to create a semipermanent satellite system to represent the project. But this acceptance without integration leaves the innovation continuously vulnerable to rejection. The goal, organic integration, will result in host system expansion and/or transformation. If budgets are limited or the system is under attack from the outside, both alternatives may be too risky or unpopular.

The Change Agent Role at the Back End

It is important for change agents to recognize and appreciate the doleful dynamics of the back end. Potential problems can be forestalled or ameliorated by building recognition into the original planning processes to extend the time needed for integration, program for expanding costs and labor-intensive changes, and anticipate the high risk of challenging the immunity mechanism of the host system.

Change agents can consider several alternative back end strategies to assist the change process and can decide whether the innovation is really good for the client and how its acceptance can be justified in the cost/benefit equation. Developers can abandon their frequently egocentric investment in the totality of their innovation and design the system so that its components can be adopted separately. Finally, they can plan for a permanent satellite support system that is less threatening to the host system's integrity.

It is a good idea to develop specific plans for routinizing the innovation's use. Change agents can make an analysis of resisting factors and persons and identify the most likely reasons for resistance in each case; plan specific strategies of approach to key leadership (especially middle management leadership), opinion leaders, and the leadership of the resistance groups; analyze the competing forms and operations that must be replaced and consider those which can coexist permanently or temporarily without compromising implementation; plan how innovation costs can be factored into the regular budget; consider the structural and procedural arrangements that need to be made for maximum integration; and finally, consider who needs to be trained or retrained and how to set up a routine recruitment and training operation to support continuation.

The back end of the change process will continue to be problematic. Careful planning on the part of change agents can help cope with the doleful dynamics of the back end of the change process and give needed, useful innovations their best chance of permanent acceptance.

IMPLEMENTING INNOVATIONS IN THE ARMY: A CASE STUDY

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During the late 1960s and early 1970s, Army leadership identified a need to improve the quality of its tactical training (see, for example, U.S. Army Continental Army Command, 1971). In the ensuing decade, actions were taken to make a variety of changes. Some of these actions led to organizational changes intended to realign training authority and responsibility and to provide an improved organizational base for the development of training innovations. Other actions led to major changes in training philosophy and options available to unit commanders. Although training developers have produced many excellent potential improvements, in general too little thought has been given to the organizational context in which these innovations were to be employed, to the processes required for successful implementation, or to the policies needed to support the sustainment of innovations.

The history of one tactical training method, known in the Army as REALTRAIN (Shriver et al., 1975), provides examples of problems that are likely to face most training innovations introduced into Army units. REALTRAIN was developed in the early 1970s; data from several field tests showed clearly that it was superior to the alternative methods commonly employed to train small combat units (Meliza, Scott, & Epstein, 1979; Scott, Banks, Hardy, & Sulzen, 1979a; Scott, Meliza, Hardy, Banks, & Word, 1979b; Scott, Meliza, Hardy, & Banks, 1980a). Yet despite its demonstrated effectiveness, subsequent training studies indicated that the system was not often employed (Roberts-Gray, Clovis, Gray, Muller, & Cunningham, 1980; Scott, 1980b).

Problems with REALTRAIN began before any attempt to field the system. While it was in the later stages of development, several field tryouts were held to refine the training methodology and to demonstrate the potential effectiveness of the system to senior Army leaders. These field tryouts resulted in mixed blessings. Senior leaders responded enthusiastically and felt that the system could dramatically improve the tactical proficiency of small combat units, but unfortunately, the enthusiastic responses by participants as well as senior management led to premature fielding.

One result of the decision to field REALTRAIN prematurely was a truncated test and evaluation program. An ideal development sequence for a major training system should include four basic types of testing activities: prototype development tests, system-intensive or validation tests, system-extensive or user-oriented tests, and operational evaluations. Prototype development tests are normally directed toward assessing the viability of key concepts and methods and determining the requirements for system refinements and training support documents. Several such tests were carried out during early REALTRAIN development phases and resulted in the basic methods and equipment fielded with the system.

System-intensive tests are conducted to determine quantitatively, insofar as possible, the potential effectiveness of the system and to identify its advantages and disadvantages relative to alternative approaches. The REALTRAIN system-intensive tests were not conducted until more than 3 years after the

system was first fielded. One test was conducted in the spring of 1977 (Meliza et al., 1979; Scott et al., 1979a) and a second in early 1978 (Scott et al., 1979b, 1980a). Because of that time lag, the findings were not relevant to improving the viability of REALTRAIN, which by that time was rarely employed in most units.

System-extensive tests are directed toward evaluating the practical utility of systems in a typical operating environment. A system is implemented in a single unit and the extent and quality of use is closely monitored over an extended period of time (e.g., 6 months to a year). No such tests were conducted for REALTRAIN; omitting this user-oriented test resulted in a lack of information on the "environmental fit" of the system. Thus, the impact of personnel turbulence and shortages, training resource scarcity, and other competing requirements could not have been (and was not) anticipated.

The final phase of a comprehensive test and evaluation strategy is the operational evaluation conducted during and following full-scale implementation. This evaluation was also omitted from the REALTRAIN program: Following initial delivery to units, there was virtually no systematic feedback to either the training developers or to senior managers of the user organizations. There was then no basis for making prompt, informed changes either to the system or the training environment.

Implementation

A second problem rooted in the prefielding phase was the incomplete development of an implementation plan. As in many large organizations, developers of innovations for the Army are organizationally separated from the user community. For REALTRAIN, developers and users had little active, ongoing dialogue on how best to develop, implement, and sustain the system. The lack of effective interaction between REALTRAIN developers and the primary target users undoubtedly contributed to underestimating the problems faced by REALTRAIN following deployment. The feeling of many of those then responsible for the implementation effort could be summarized as, "REALTRAIN provides such a dramatic improvement in small unit tactical training capability that the system will succeed on its own obvious merits." Further, the basics of REALTRAIN, it was thought, were straightforward enough that only basic instruction, demonstration, and some supervised practice supported by the appropriate training documents were required. There was no formal, integrated plan for implementing and sustaining REALTRAIN other than planning and scheduling a Mobile Training Team to introduce REALTRAIN to the field.

Beginning in January 1974, the Mobile Training Team visited user installations and trained key personnel to use the system. In the hands of these experts, REALTRAIN was deceptively simple. And perhaps it was that apparent simplicity that led developers to plan relatively brief visits to each installation and not to plan for return visits to correct system shortfalls. In addition, there was no integrated effort to ascertain whether those trained had adequately developed the knowledge and skills necessary to prepare for and execute REALTRAIN training by the end of the Mobile Training Team visits. Indeed, subsequent observations have suggested that even in units where REALTRAIN became most widely used, some integral parts of the training method were rarely used as designed, and reduced effectiveness probably resulted.

Utilization

With the departure of the Mobile Training Team, REALTRAIN was plunged into a highly complex training environment with competing demands for time, personnel, and resources. Company and higher level commanders said that they had considerable difficulty in meeting the REALTRAIN support requirements, especially for exercise controllers; company commanders would take the time to train a cadre of REALTRAIN controllers only to find a few months later that, because of "normal" personnel turbulence, many of them had been assigned to other units. It is hardly surprising that many commanders felt that the preparations necessary for REALTRAIN exercises were not a productive use of time and resources. In addition to these personnel support problems, REALTRAIN required additional equipment, which per se was not a major problem, but the time and effort required to request, obtain, issue, install, organize, and account for the equipment was often seen as a more serious deterrent to the routine use of REALTRAIN.

Introducing any innovation into a context in which a need for change or improvement is not perceived is difficult. Despite evidence to the contrary, many small unit commanders seem to think that their units are adequately trained (Scott, 1980b; Roberts-Gray et al., 1980). Such beliefs reduce the probability that training innovations will be employed. A related point is that there were few incentives for proper, sustained use of REALTRAIN. Senior Army management has consistently maintained that training is among the Army's highest priorities; nevertheless, REALTRAIN failed to receive enough management support to enhance its competitive position in the smaller units. Fundamental training documents failed to incorporate REALTRAIN fully; system utilization was not mandated. The failure to implement adequately the policy articulated at the highest levels of the Army probably contributed as much to the failure of REALTRAIN as the problems with the development and fielding of the system.

Conclusions

In the preceding discussion, I have tried to show the breadth and complexity of issues confronting those responsible for training development programs in the Army. REALTRAIN was chosen as a vehicle for this discussion primarily because it was typical in many respects of several innovations fielded during the past decade with similar results. The history of the REALTRAIN failure suggests the existence of Army management and policy problems that place training development programs in a high-risk category. After nearly 10 years of operation, the Army's training development organization has yet to produce adequate policy and guidance for the development, implementation, and maintenance of its innovations. While life-cycle system models have been produced for the Army's major hardware systems, not one model exists to guide training development programs. As a consequence, systems are developed on the basis of informal and sometimes inaccurate assessment of user needs and capabilities. Lack of adequate predeployment testing, especially user-oriented tests, and incomplete implementation planning predispose many potentially valuable innovations to failure even before they are fielded, and allow unsupportable or unworkable innovations to be deployed. Lack of systematic postdeployment monitoring of the extent and quality of use of innovations makes it highly difficult to make informed changes either to the innovation or to the embedding context.

The management and policy of the Army's user community is also in need of fundamental improvements if it is to use effectively the training developments produced for it. First, users need to recognize that their early and continued involvement in the training development process at a meaningful level of effort is central to the improvement of their training capabilities. Policy that supports active participation in the specification of training development needs and in the processes of program development is needed. When decisions are made to field new systems, the management of the user community should provide the support and incentives necessary to ensure continued, high-quality use of the product. Finally, and perhaps most difficult of all, steps need to be taken to ensure the effective implementation of Army training policy decisions. Failure to do so will have a continued negative effect on the Army's ability to close the implementation gap.

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IMPLEMENTING A RIFLE MARKSMANSHIP PROGRAM FOR THE ARMY

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Today, in discussing change and its implementation, more often than not the thrust of discussion centers around resistance to change and how to overcome blockages in the implementation process. There is, however, another facet of the change process that bears exploring: analysis of factors facilitating the development, management, and implementation of change. In discussing the Army's new rifle marksmanship program, I would like to concentrate on those variables that facilitated our success and that, I believe, will ultimately help to close the implementation gap.

The first and perhaps key variable was a recognized need for action to improve rifle marksmanship skills. The list of critics of the existing system of rifle marksmanship training grew during the late 1970s. Numerous requests to the U.S. Army Infantry School (USAIS) for assistance indicated that many trainers, leaders, and managers were dissatisfied with their soldiers' proficiency with the M16 rifle. Further, some of the Training and Doctrine Command (TRADOC) institutions had begun to implement local initiatives or "get well" programs during their Basic Rifle Marksmanship instruction.

Instructional time was restructured, new learning activities were added, and the scope of previous activities was changed. The old program required 37 hours of instruction and 334 rounds of ammunition; the new program, 59 hours and 339 rounds. New targets were used for scaled range firing and known distance firing, and a modified target was used for zeroing. New technology, in the form of a shooting gallery-like device, was used as a diagnostic and remedial tool. Program standards were also increased while time exposure decreased. Thus, resources, content, structure, training aids/devices, and standards changed; the new program requires more time and more ammunition than the old one. But these costs were accepted because users recognized the need for an improved rifle marksmanship program.

Formal and informal authority/responsibility relationships inherent in the system also facilitated success. USAIS was the proponent for rifle marksmanship and for the Basic Training Phase of One Station Unit Training, to which rifle marksmanship belongs. The personal interest of one of the Assistant Commandants provided a sense of urgency down the chain of command. The current Commandant, as well as former ones, had established a channel of communication through the use of periodic update letters to division commanders. This informal forum helped to build a credible image because problems surfaced in letters or messages to the Commandant, Assistant Commandant, or the appropriate directorate. This feedback system allowed the action agency to monitor sentiment continually without excessive filtering.

The U.S. Army Research Institute (ARI) field unit at Fort Benning, also within this authority/responsibility structure, had the mission of assisting in the resolution of behavioral issues supporting the infantry's role in land combat. One of ARI's principal clients was the Directorate of Training Developments (DTD), the program manager for rifle marksmanship. The ARI unit at

Fort Benning had long been involved in the marksmanship arena, had studied the problem, and had produced some excellent baseline studies. Relationships among the organizational elements are shown in Figure 1.

A third major factor contributing to success was the establishment and maintenance of working relationships. The relationship between ARI and the action agency (Systems Division, DTD) was excellent, despite the high turnover of officers in Systems Division, which resulted in the necessity to reaffirm goals periodically, set priorities, and establish mutual trust. An excellent bond was also established between the researcher (ARI) and the trainer (Chief of Victory Academy, Committee Group). The colonel in charge served as catalyst. He shared the common goal of improving soldier skills, and his significant energy, motivation, and cooperation were indeed instrumental during this phase of the program. His cooperation facilitated dealing with the chain of command.

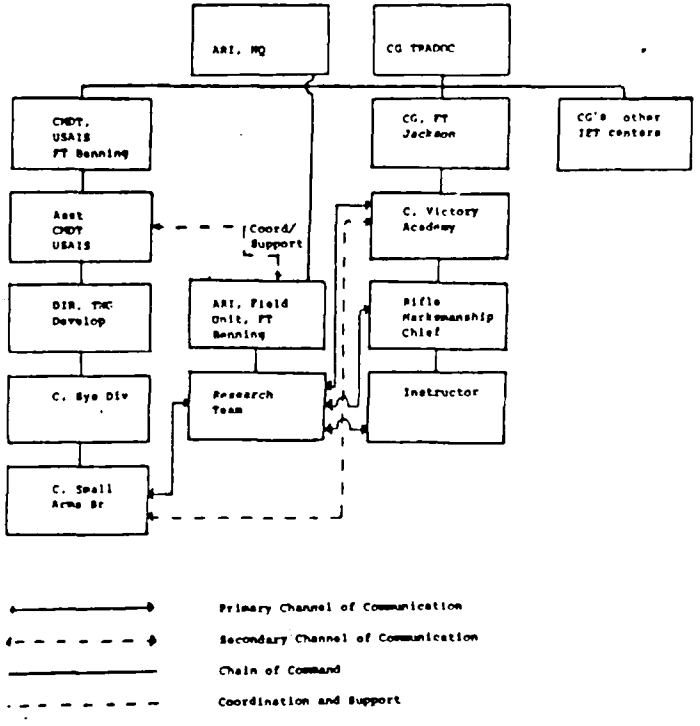
The fourth key element was research planning and execution. A team of researchers took part in the rifle marksmanship program of instruction along with Initial Entry Training soldiers at Fort Jackson. This instruction was not a special course or executive overview; the researchers took the program period by period as the soldiers did. As a result, credibility and important communication links were established. Both were essential to later dialogues with soldiers and trainers. The research tested the hypothesis that increased feedback improves performance. The experimental design was clean, and sampling entirely adequate; hundreds of soldiers were used.

During the validation phase of the project, ARI and the action agency planned for phased implementation to ease resource impacts on trainer and user. Classes were scheduled for trainers on new or changed periods of instruction, and briefings and instructor guides were provided to first-line trainers and supervisors.

The last factor contributing to success was the awareness of both researchers and the action agency of the need for a marketing strategy. Joint sessions were periodically conducted to assess not only program elements, but also those formal or informal actions that would inform and persuade decision makers of key organizations to gain and maintain their support. This process does not imply a detailed written plan updated at regular and specified intervals, but rather a continued recognition of the need for organizational and individual support in the short- and mid-range. The actions accomplished between researcher and action agency included ensuring goal congruence with key policy makers, establishing and maintaining good communications, using multiple communication networks at various organizational levels, keeping decision makers informed at critical or important milestones, conducting periodic goal setting/strategy sessions, presenting a united front by working out in-house problems before briefing others, conducting conferences and training for implementors, and using formal and informal media to inform and persuade (e.g., letters to commanders and articles for publication in Infantry magazine).

This approach was oriented more toward use of informal authority to facilitate cooperation and compliance. The use of power (e.g., a decision paper signed by the general and directing something to be done) was reserved for the most critical issues.

Phase I Relationships: Analysis and Test



Phase II Relationships: Validation

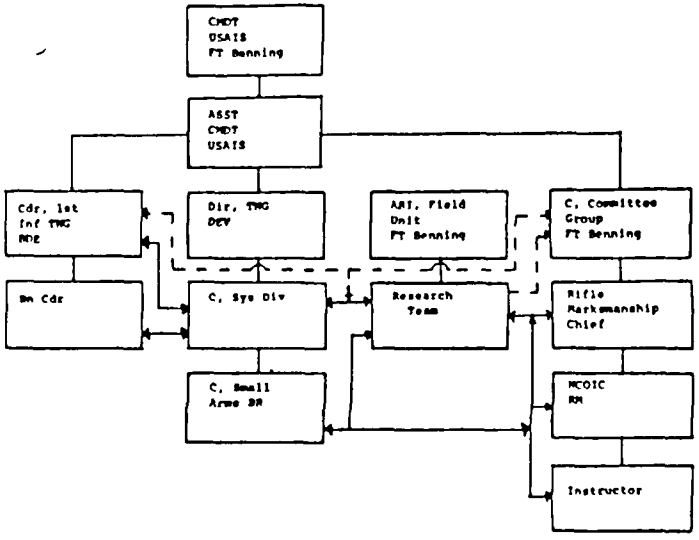


Figure 1. The formal and informal authority/responsibility structure facilitated success for the rifle marksmanship project.

In summary, the need for change was recognized. The formal and informal structure of authority worked to the program's advantage. Effort was focused on gaining and maintaining working relationships. The approach to research and validation and the continual sensitivity to the need for marketing the product contributed to success. This program obviously had some unique facets. The first of these was cost, because it was principally labor intensive, and the schedule could be back peddled because good performance was achieved. The incremental recurring cost for program implementation was not large, and there were obvious spinoffs into other areas of individual and collective marksmanship and gunnery programs. Also, the program did not suffer the limitation of a fixed budget. Second, the problem was well defined, and the initial research yielded excellent results. Management and the individual risk of performance (or nonperformance) were not a deciding factor in overall mission accomplishment by the organizations. Understandably, no two research and development efforts are exactly alike; nevertheless, some valuable lessons can be learned from this effort.

Although the program has yet to undergo full implementation, I am satisfied with the progress made to date and confident that the program has been directed and managed with the major objective of closing the implementation gap.

IMPLEMENTATION IS A PLANNING AND DESIGN PROBLEM

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Continuous innovation is generally seen as an inevitable fact of modern life. Why, then, are so many people discussing why innovation is not taking place? Perhaps it is because they are focusing on some specific program or solution that did not materialize, without putting it into context with the innovations that did. We (as well as others, e.g., Downs & Mohr, 1976) believe that this is an erroneous way to look at implementation. Attending to one particular innovation with scant reference to the many other changes going on in an organization reduces implementation to a selling, packaging, or lobbying effort. Typically, one group of people develops a program or solution for another group of people to use. When the second group does not use the program, the first group calls it an "implementation gap." The second group might prefer to use the term "design gap," citing such reasons as lack of resources, poor timing, politically ill advised, misunderstood, too threatening, too risky. These reasons are each part of an overriding problem--incompatibility of the proposed innovation with the other events in the organization. In the face of changes continually bombarding an organization, a presumed dichotomy between design and implementation increases the likelihood of this incompatibility--and of implementation gaps. In this paper we discuss some myths that have perpetuated this false dichotomy and suggest some general strategies for overcoming these gaps.

We see the implementation problem as composed of three psychological gaps: a value gap, a knowledge gap, and a behavior gap. Each can result from certain myths (Wacker & Nadler, 1980).

Value Gap

Incompatibility between a proposed innovation and other organizational events can stem from a difference in values. Solutions to defined problems are likely to be rejected by those who do not share the definition of the problem. For example, one popular misconception about industrial quality-of-working-life programs we call the "altruism myth": that quality-of-working-life programs are for the benefit of the workers--who ought to be grateful--and that the organization benefits from the resultant goodwill. If paternalism or mutual trust permeates the organizational context, then an assumption of altruism may be warranted. However, when other organizational events do not occur within these values, then altruism may appear as thinly veiled one-upmanship. A value gap then exists between the intentions of the program's designers and the users' perceptions of reality.

In order to avoid value gaps, the change agent must not expect values to change all at once. Neither should the change agent treat values as fixed. The target innovation may have to be preceded by structural changes that create value-changing experiences and expectations. Often values can be changed by the vicarious experiences of peers. Wacker (unpublished) conducted a study

of worker reactions to new job designs in an aluminum smelter. The company wanted to compare the before-and-after attitudes of three groups of workers whose jobs were changed with attitudes of a fourth group whose jobs would not change for another 6 months. Unexpectedly, all four groups reacted positively. Interviews revealed that workers in the fourth group, because they expected changes soon, began to feel more positive about their existing jobs. The study had erroneously assumed that workers perceived and evaluated their jobs in a here-and-now context, when in fact perceptions and values were tethered to many points in space and time.

Knowledge Gap

Incompatibility between a target innovation and other organizational events can stem from a difference in knowledge. Although they are attracted by the values implicit in a new idea, users may not have enough skill and knowledge to make it work for them. The resulting frustration can cause them to reject the innovation and retreat to more familiar practices. In a study of cognitions of food-plant workers organized into five autonomous work groups, Wacker (1979, 1981) found that in two groups knowledge of the technical system developed at a slower rate than knowledge of the social system. This fact created a number of problems for those two groups that did not arise for the other three groups.

One of the myths that contributes to knowledge gaps is the "know-it-all myth": the faith that the scientific method is the key to innovation (Nadler, 1978). In reality, social science has yet to produce a reliable technology of innovation. Taylor and Wacker (1976) reported the case of a midwestern paper mill where labor-management relations had deteriorated to the point that the mill was sold for scrap value. The new owners decided to try to keep the mill open and instituted a survey-feedback program package purchased from a university. The program floundered for 18 months. Then some of the groups "broke the rules," disregarded the survey data entirely, and structured their meetings around specific problems with their machinery. This breakthrough contributed to the mill's dramatic turnaround. The small-town blue-collar workers and supervisors valued the new plans for group meetings, but were not able to deal with behavioral-science data. They wisely rejected the university approach and built the group discussions around their existing knowledge.

Also contributing to the knowledge gap is the "cloning myth": that what worked well in one setting is likely to work well in comparable settings. Most innovations are modified as they are assimilated into a system. Rogers (1978) studied the implementation of "Dial-a-Ride," which about 240 cities had adopted by 1978. Rogers found it "impractical to measure the degree of re-invention in terms of deviation from a 'main line.' It was almost as if the innovation of Dial-a-Ride were evolving as it diffused."

Cloning may result from the use of outside consultants. Nadler (1981) consulted with a team of hospital personnel to design an improved library system for medical records. Eight months later the consultant received an assignment from a similar hospital to improve its library system for medical records. Recommending the first hospital's solution appeared to be a good approach, but appearances could have been deceiving. Instead, the consultant set up a project team to start from scratch. The team identified somewhat different purposes from those of the first hospital. The team was able to borrow and adapt software

from the program used by the first hospital, but there were fundamental differences between the final designs of the two hospitals.

Behavior Gap

Job descriptions, organization charts, compensation schemes, and physical layouts all exist primarily to direct individual behavior. When an innovation is divorced from these organizational mechanisms, a behavior gap can exist. Pellegrin (1978) reported on the implementation of a new concept for organizing teachers. At experimental schools, staff members were presented with the general goals and principles of the innovations and scheduled for workshops to plan their implementation, but the innovations did not materialize. Pellegrin reported, "Problems did not 'work themselves out' under operational conditions.... There was an inability to relate the goals to what was being done by the staff. Accordingly, familiar work routines were not fundamentally changed." This illustrates what we call the "snapshot myth": focusing on the before-and-after images of innovations without developing an orderly progression of transition steps. To do something new we usually have to undo something old. This process often affects work habits, social linkages, authority and jurisdictional lines, rewards and incentives, risk bearing and career expectations, resource allocation, and training.

Just as various aspects of an organization can be affected by an innovation, the innovation may be affected by the organization. But often such organizational changes take years to materialize, as people only gradually learn the nuances of the changes and only gradually modify their strategies, work habits, and interaction patterns. Failure to recognize the evolutionary aspects of institutional innovation we call the "instant gratification myth." Proponents of innovations who declare a program successful only to see a "backlash" develop later are victims of this myth.

Behavior gaps can also be created by what we call the "department of ... myth": that it is desirable to set up a separate department to take charge of an innovation. The proliferation of such narrowly oriented departments can strangle innovation in the long run.

Timeline Strategy of Planning and Design

A number of planning and design principles have been formulated for avoiding implementation gaps (Nadler, 1981). The first principle is this: develop no program or solution for a problem unless it is defined with full reference to the total organizational context. Among the techniques developed to help broaden problem definition are purpose expansion and ideal-system generation. Another very useful exercise is to have key managers develop a document of management philosophy (Davis & Wacker, in preparation). Although these activities may appear a fanciful waste of time, they help to uncover values, knowledge, and behavioral conditions that could otherwise develop into implementation gaps.

A second principle is this: involve people. The creation of steering committees and task forces that cut across hierarchical and departmental lines helps prevent gaps from developing. A corollary is that participation in a new

program should be voluntary. This corollary is antithetical to experimental requirements for control groups, random assignment, double-blind treatments, and so on. However, involvement in the planning and design process makes the resulting plans more acceptable. In the world of implementation, halo effects and self-fulfilling prophecies are not always bad (depending on the prophecy). In the ideal case, the roles of experimenter and subject (or designer and user) are merged.

A third principle is this: use information and knowledge. When possible, assumptions and perceptions should be tested through systematic investigation. Committees can be taught to use data-collection, analytic, and modeling techniques (Davis & Wacker, in preparation) and to develop habits of empirical inquiry. Data and models must be at a level that users themselves feel comfortable with. When the responsibility for empirical and conceptual matters is delegated to experts, implementation gaps begin to develop.

Also, empirical inquiry and conceptual development must be conducted on an ad hoc, iterative basis. The understanding of the problem addressed in the planning effort is likely to evolve in many ways during the process. Premature closure on models, methods, and measures (the "3 Ms") can freeze innovation out of the changing organizational context.

A final principle is this: continue change and improvement. Once an innovation is implemented, it becomes a part of the context into which other innovations must be assimilated. The snapshot myth of before-and-after states should be resisted. The mechanism created for planning and implementation may be more important for the organization in the long run than any single innovation.

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A MODEL OF IMPLEMENTATION

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In recent years the United States Army has had difficulty implementing some of its more complex training products. Since 1978 I have been studying the implementation of early generations of tactical engagement simulation systems and modeling the implementation of exportable training products to operational units. One result of this effort has been a model of implementation that describes how the unit's training environment can be modified to accommodate new training products that substantially alter the way training is done.

The model of implementation has several important features. It highlights the need, before the product is developed, to assess the operational environment into which the product must fit and allows for the development of plans based on the changes this product is likely to create in the user unit. The model breaks the implementation process down into four phases: orientation of the user to the product, fielding of the product, support of initial user trial, and integration of the product into routine Army training.

The successful completion of each stage of implementation depends on four elements: input, actions, goal achievement, and feedback. Figure 1 illustrates each of these elements in the fielding stage.

I believe that the core of implementation is the evaluation of goal achievement at each stage. Each goal can be evaluated in terms of four specific outcomes in the user unit: individual acceptance of the product and the know-how for using it, and organizational management and policy to support and control use of the product. Each of these outcomes evolves over the four stages. For example, to accept a product fully the person must perceive a need for it in Stage 1, be motivated to use it by Stage 2, be favorably impressed with its performance at the end of Stage 3, and finally, accept the product as a normal and routine part of the training environment in Stage 4. Figure 2 illustrates the relationship among goals, outcomes, and stages.

Analyzing the outcomes by stage sets objectives for product managers and allows them to track progress toward implementation goals. For example, the goal of fielding, which is to have the unit ready to use the product, can only be met if individuals have the motivation and skills to use the product and if the organization has made the appropriate role and resource assignments and produced an implementation schedule.

To produce these outcomes product managers may choose any of four kinds of implementation strategies:

Motivate: alter attitudes and values of individuals

Educate: train individuals in new skills

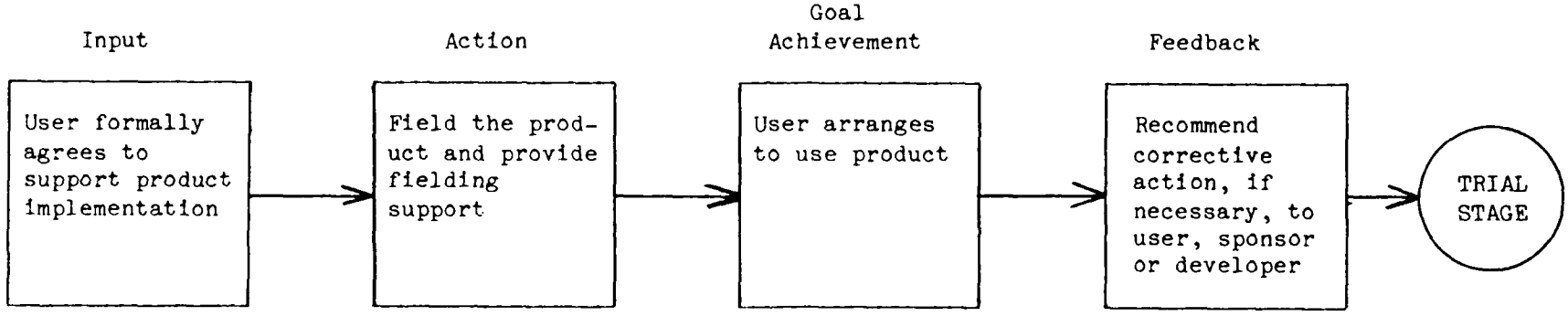

Figure 1. Elements of stage 2: Fielding.

Stages:	Individual Acceptance	Individual Know-How	Organizational Management	Organizational Policy	Goals:
Orientation	perceived need	awareness	implementation plan	utilization concept	User wants the product
Fielding	motivation	skill	role and resource assignments	implementation schedule	User is ready to use the product
Trial	favorable appraisal	experience	command emphasis	utilization policy	User intends to sustain the product
Integration	legitimation	expertise	standard procedures	enforcement	Product is integrated into normal practice

Figure 2. Criteria for evaluating implementation success in four stages of product implementation.

Assist: provide resources not ordinarily available to an organization

Regulate: exercise force, such as rewards, to control organizational activities

Managers can motivate and educate individuals to use a product or they can assist and regulate use by the organization. Each of these strategies produces different outcomes. The following relationships provide a convenient rule-of-thumb:

- Motivate to increase individual acceptance
- Educate to increase individual know-how and skill
- Assist to improve organizational management of the product
- Regulate to improve organizational control of product use

This approach to implementation has several advantages:

- It helps a product manager assess the unit training environment and set implementation objectives before deploying the product.

- It provides specific guidance for developing and executing implementation plans during the four stages of implementation.

- It controls the implementation effort by means of evaluation and feedback on the outcomes that signal implementation success at each stage.

The use of a model of implementation to plan the deployment and followup of new training products is a particularly good idea when, as in the U.S. Army, one agency develops the product, another sponsors its introduction, and a third uses it in the field. An implementation model can establish procedures for coordinating the efforts of all the major agencies involved in implementation and provide a sort of institutional memory to keep track of successes and detect problems during an implementation effort.

DISCUSSION

The papers presented in this report supported a symposium on the topic of implementation sponsored by the Division of Military Psychology and conducted during the meeting of the American Psychological ASsociation in August 1981. Dr. Ralph Dusek of the U.S. Army Research Institute for the Behavioral and Social Sciences acted as Discussant for the symposium.

The symposium began with a probe into the nature of the implementation problem for training products in the Army. Major Loftin observed that there is no uniform or standard procedure for implementation planning in the current system of training development. Implementation is understood to be the responsibility of the user. Among developers, he said, the prevalent attitude is "we're going to roll that item off the production line and the field had better be ready." Dr. Scott pointed out that often the field cannot be "ready" for new items because resources are already fully committed--new items must compete with existing requirements that are already consuming all the resources.

The symposium panel agreed that closing the implementation gap for training products will require integration of implementation planning into the training development process. Members of the audience attending the symposium suggested, in fact, that users should only implement products that come with a complete implementation package, or that new products should be delivered only to those organizations that have developed their own formal implementation plans. Dr. Scott indicated that Army policy should assign responsibilities and establish procedures for implementation planning, and Dr. Dusek endorsed the idea of a specialty office for implementation and utilization.

Dr. Dusek concluded the symposium by stressing the need to get people interested in implementation as an issue for research and action. If this is not done, he warned, support for innovation will be lost.

The views expressed here do not necessarily reflect those of the U.S. Army Research Institute or the Department of the Army.

Acknowledgments are due Dr. Jay Uhlaner of Perceptronics, Inc., and Dr. James H. Banks of ARI's Presidio of Moneterey Field Unit for their support and advice in developing this report and in organizing the symposium from which it derives.

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